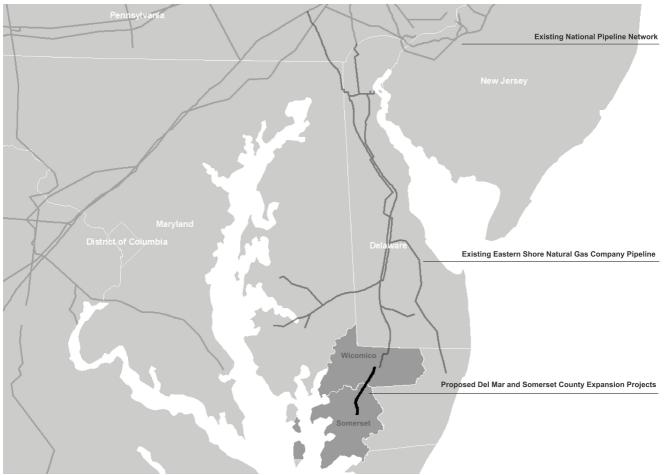
Del-Mar Energy Pathway & Somerset County Expansion Projects: an Environmental Justice Spatial Analysis

The following spatial analysis summary addresses the distribution of potentially eligible Environmental Justice populations and initial screening for toxic burdens in the pathway to two proposed shale gas projects. Transecting Wicomico and Somerset counties in a southward trajectory from upstream interstate supply in the Marcellus Shale, the Del-Mar Energy Pathway & Somerset County Expansion Projects - while 'separate' on paper - are here analyzed as one induced impact. Similar in size and sharing above-ground facilities, the two projects would be part and parcel relative to demographic distribution in the projects' pathways.



mapped data sources: U.S Energy Information Administration, The Federal Energy Regulatory Commission, U.S. Census.

Section I: Project Introduction and Context

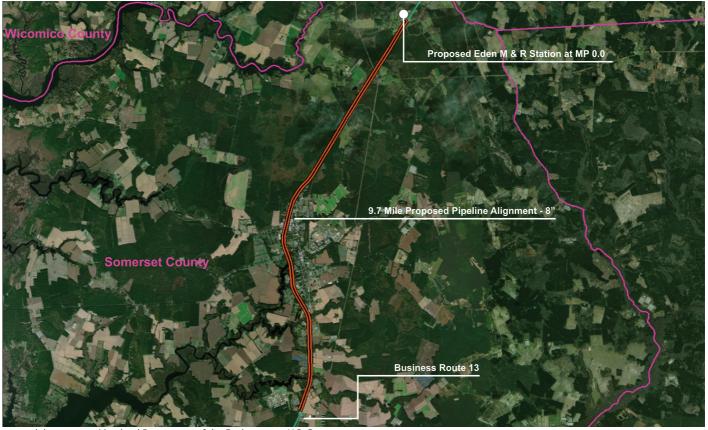
Northward of the Somerset County Expansion Project, the Del-Mar Energy Pathway Project would begin with a connection to the existing Eastern Shore Natural Gas Company pipeline network at/near the intersection of the Salisbury Parkway and Salisbury Blvd (Bus Rt. 13) within Wicomico county. At this location - MP 0.0 - an above-ground pigging facility would be placed. At MP 3.71, an additional Mainline Valve assembly would be placed. Further south at Eden, a Metering and Regulation Facility would be built, serving as the terminus for the first project; and the beginning of the second - the Somerset County Expansion Project. Both project alignments are shown in the following two maps:

• Map 1 - Del-Mar Energy Pathway Project:



mapped data sources: Maryland Department of the Environment, U.S. Census.

• Map 2 - Somerset County Expansion Project:



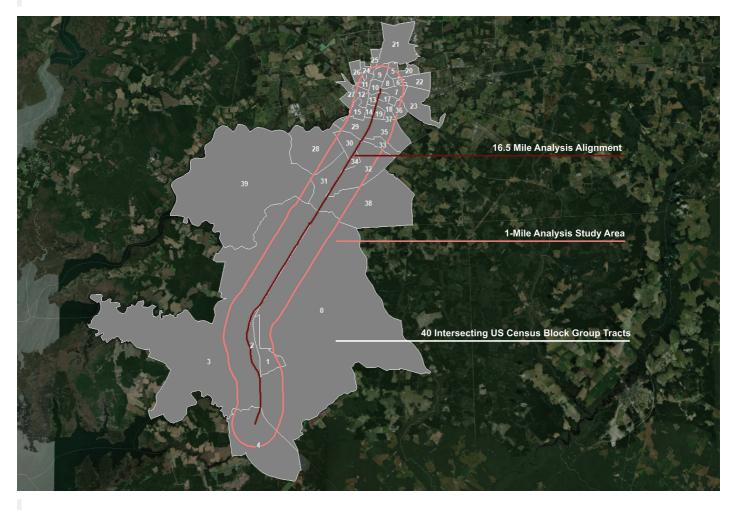
mapped data sources: Maryland Department of the Environment, U.S. Census.

Section II: Environmental Justice Spatial Analysis Framework

Utilizing match sheets located in the FERC EA and Maryland Department of the Environment applications for the two projects, proposed alignments were digitized through a GIS spatial process known as georeferencing. As the two separate projects connect in the above-ground metering and regulation station proposed for Eden, Somerset county, the projects were merged, resulting in one complete 16.5 analysis alignment. From this alignment, a 1-mile proximity study area was determined, totaling 35.98 square miles.

With the study area determined, an overlay process between the study area and intersecting U.S. Census Block Groups (CBGs) was conducted. The resulting analysis alignment, 1-mile study area and participating CBGs are shown below:

Note: Demographic analysis for the project was conducted in the software package R. Utilizing the tidycensus package, all variables and calculations in this study are produced with U.S. Census American Community Survey 5 year estimate for the period 2014-2018.



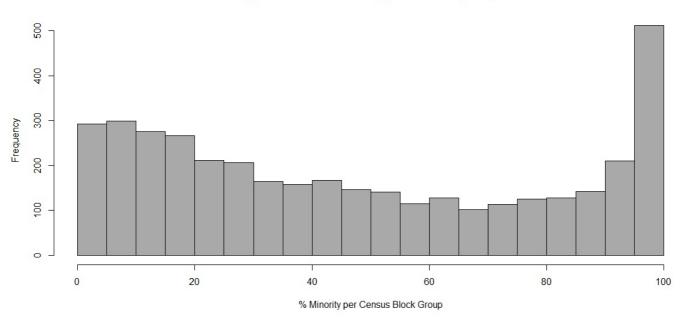
Note: A table with square area (miles) and total population per CBGs shown above is available at this **endpoint**.

In order to determine Environmental Justice thresholds, all CBGs within the State of Maryland were processed, deriving statistical profiles for both a minority and low-income variables. Extensive research exists for the viability of the minority and low-income variable as lead screening variables. Importantly, this is the method utilized by the EPA within the EJSCREEN product. In this analysis, the mean value for both the minority and low-income variables was first determined for the State of Maryland using the 2018 US Census ACS 5 year product. This mean value then operated as the threshold value to determine potential EJ eligibility within the 1-mile analysis study area. If a study area CBG scores higher than the state threshold, it is coded as EJ eligible; conversely, if it falls under the state threshold, it is here considered ineligible for further consideration.

Before disaggregating to the each CBG, it is important to review the state and 1-mile study area aggregated profiles. Shown in the table below, the state is compared to the project study area. Not only is the study area denser than the statewide average, it scores above the state on the minority variable, and significantly above the state on the low income variable. In addition to the summary table, two histograms are provided showing the distribution of the two variables across all state CBGs:

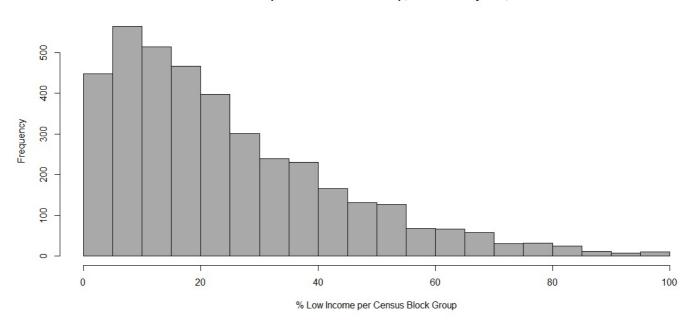
Geography	Total Population	Density (persons pre sq. mile)	Mean % Minority	Mean % Low Income	Median % Minority	Median % Low Income
State of Maryland	6,003,435	614	47.74	24.33	42.34	19.33
1 Mile Proximity Analysis Area	35,628	991	54.31	43.15	50.67	42.29

% Minority per Census Block Group, State of Maryland, ACS 2018



Note - minority definition used in this analysis: the number or percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, since multiracial individuals are tabulated in another category – a non-Hispanic individual who is half white and half American Indian would be counted as a minority by this definition.

% Low Income per Census Block Group, State of Maryland, ACS 2018

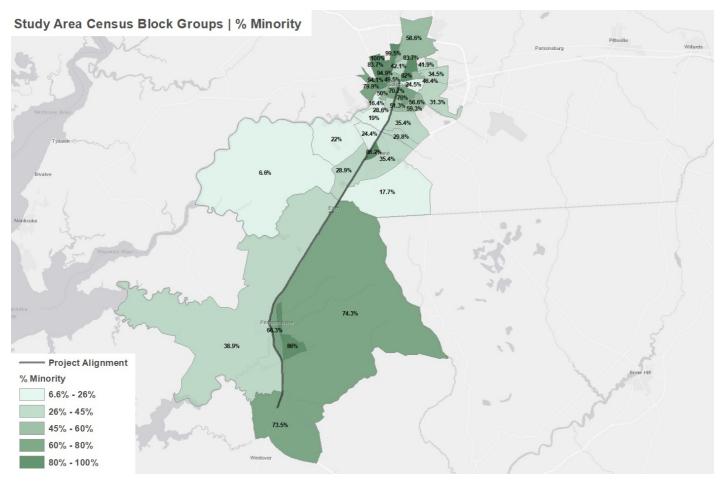


Note - low-income definition used in this analysis: the number or percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."

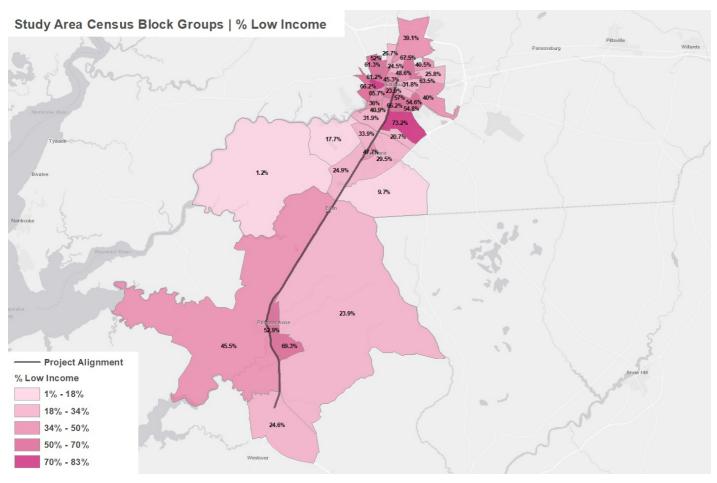
Section III: Environmental Justice Analysis Results - Large Scale Mapping

While the **Section II** findings strongly suggest the presence of EJ eligible communities in the study area, mapping of the 40 intersecting CBGs can denote specific, disaggregated eligible geographies across both the minority and low income variables.

The following two thematic maps - one for the minority variable and one for the low income variable - are shown in preview within the document, and further available as stand-alone 11x17" PDF documents linked below.



• Stand-alone 11"x17" Study Area | % Minority Thematic Map



• Stand-alone 11"x17" Study Area | % Low Income Thematic Map

Section IV: Existing Toxic Burden Screening

In addition to the threshold analysis of **Section II and III** above, an existing toxic burden analysis can be conducted via the EPA EJSCREEN product. While the EJSCREEN product offers an index that is the product of population density, demographics and 11 environmental variables, the analysis herein isolates the environmental variables and compares their mean value and percentile position at national, state and CBG scales. In this way, the study area and each CBG unit can be compared outward to the state and national scales easily, determining comparative concentration/risk.

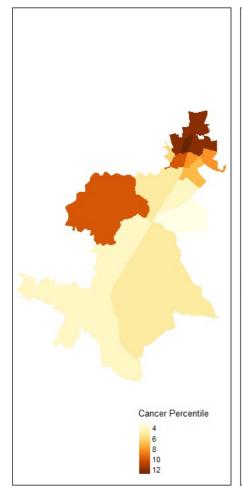
To start, the following table summarizes the mean value for 3 geographic scales - national, state and the 1-mile study area. Where the 1-mile study area value is higher than both the state and national, an elevated concentration/risk exists in the 1-mile study area based on a mean value threshold. In review of the summary table below, most values in aggregate within the 1-mile study area are near or below national and state mean values.

• ** Mean Variable Comparison Chart:**

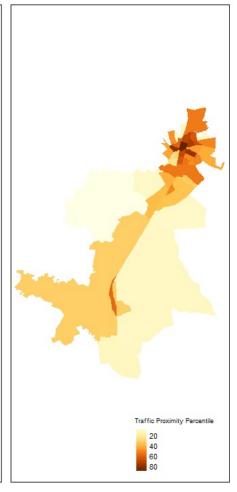
Variable	National Mean Value	State Mean Value	1-Mile Study Area Mean Value
NATA Air Toxics Cancer Risk (risk per MM)	31.29	31.62	25.64
NATA Respiratory Hazard Index	0.43	0.44	0.32
Traffic Proximity and Volume (daily traffic count/distance to road)	784.4	787.9	430.1
NATA Diesel PM (μg/m3)	0.481	0.645	0.287
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	27.30	0.28	0.000923
Superfund Proximity (site count/km distance)	0.137	0.131	0.026
RMP Proximity (facility count/km distance	0.780	0.805	1.237
Hazardous Waste Proximity (facility count/km distance)	4.15	1.98	2.71
Ozone (ppb)	42.93	47.18	42.85
Particular Matter - (PM 2.5 in μg/m3)	8.23	8.30	7.49
Lead Paint Indicator (% pre-1960 housing)	34.2	35.0	34.6

While the 1-mile study area generally exhibits at or lower than national and state mean values across the 11 environmental variables tracked by EPA EJSCREEN, a disaggregated percentile approach per CBG shows variance within the 1-mile study area. In this analysis, the percentile value **within the State of Maryland** is returned for each of the 40 CBGs within the 1-mile study area. In others words, any CBG that returns a percentile above 50 for any environmental variable suggests an elevated concentration/risk above the state median. The resulting multiples show the results of each of the 11 environmental variables within each study area CBG. Preceding the toxic burden variable set maps below, each variable is further coded as positive or negative crossing the state 50 percentile threshold:

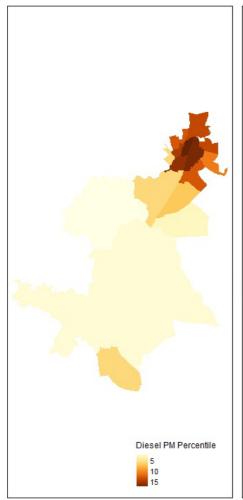
- NATA Air Toxics Cancer Risk Negative across all 40 CBGs
- NATA Respiratory Hazard Negative across all 40 CBGs
- Traffic Proximity and Volume Positive across some of the 40 CBGs



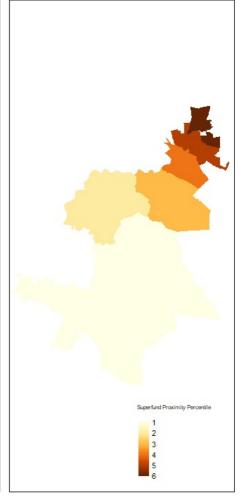




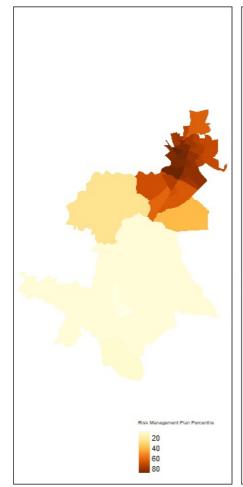
- NATA Diesel PM Negative across all 40 CBGs
- Wastewater Discharge Indicator Positive across many of the 40 CBGs
- Superfund Proximity Negative across all 40 CBGs







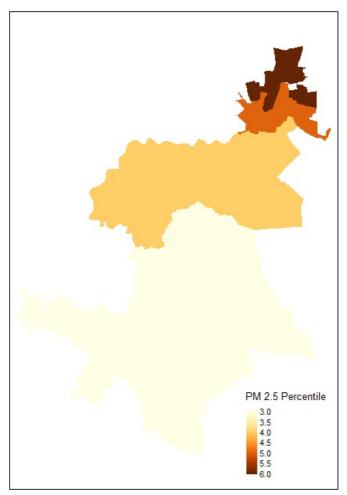
- RMP Proximity Positive across some of the 40 CBGs
- Hazardous Waste Proximity Positive across some of the 40 CBGs
- Ozone Negative across all 40 CBGs

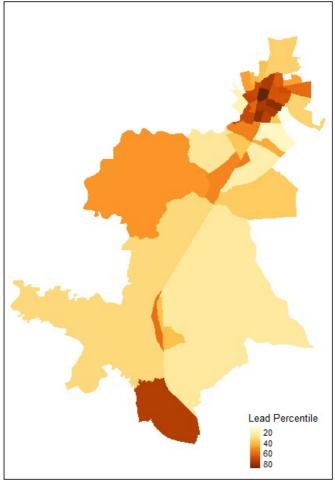






- Particular Matter Negative across all 40 CBGs
- Lead Paint Indicator Positive across some of the 40 CBGs





Section V: Final Environmental Justice Risk Map for 1-mile Study Area

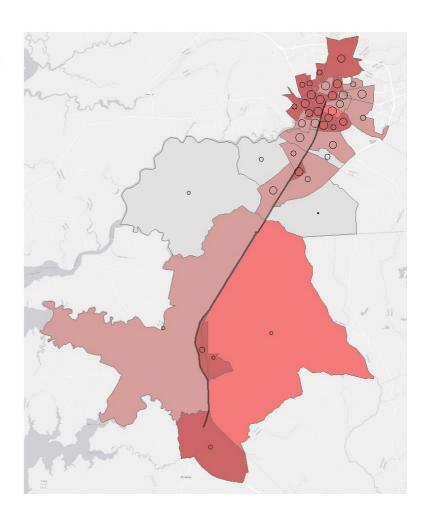
In **Section III** EJ Eligibility for the 1-mile study area was determined. Further, in **Section IV** 11 screening variables for existing toxic burdens were ordered to the state geography. CBG geographies in the study area were then classed as either above or below the 50th state percentile (median). Finally, any 'hit' within a CBG across the screening variables was tallied per CBG. The results include 'hits' across 5 of the 11 screening variables listed as follows:

- Traffic Proximity and Volume
- % housing pre-1960 lead indicator
- Major direct dischargers to water
- Proximity to Risk Management Plan (RMP) facilities
- Proximity to Treatment Storage and Disposal (TSDF) facilities

A final overlay was conducted for a multi-variable thematic map showing the proportional 'hit' count per CBG (black stroke circles) coupled with a choropleth showing EJ eligibility. From this risk map, the following conclusions can be drawn:

- More urban centers of Salisbury and Princess Anne and tracts centered alone the proposed project trajectory are generally EJ eligible. There are only 4 CBG that are not EJ eligible 10% of the total study area CBGs.
- Toxic burden is concentrated in upper segment of the Del-Mar Energy Pathway project transecting the city of Salisbury.

Toxic Burden (Type Count per CBG) October 1 1 2 5 4 5 We Burden 1 2 5 4 5 We Burden 1 2 5 4 5 EJ Eligibility EJ Eligibility EJ Eligibility EJ Eligibility EJ Eligibility EJ Eligibility



• Stand-alone 11"x17" Environmental Justice Risk Map